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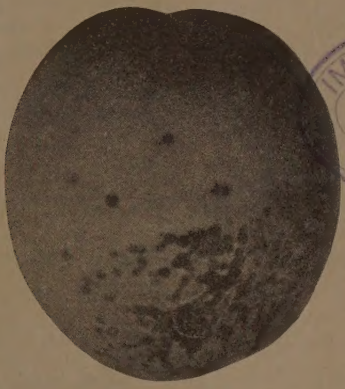

IMPERIAL BUREAU
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OF MYCOLOGY

Peach Scab

The commonest disease of peaches in Virginia. It causes unsightly and unsalable fruit and it is usually followed by rots which completely destroy the peach. This disease is easily controlled by dry-mix. (Courtesy of the U. S. Dept. Agriculture.)

THE DRY-MIX SPRAY FOR PEACHES

By

F. J. SCHNEIDERHAN AND R. H. HURT

BLACKSBURG, MONTGOMERY COUNTY, VIRGINIA

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THE DRY-MIX SPRAY FOR PEACHES[1]

By F. J. Schneiderhan and R. H. Hurt

Introduction

During the past fifteen years self-boiled lime-sulfur has been the standard summer fungicide for peaches in Virginia. This material was first recommended as a result of investigations carried on by the U. S. Department of Agriculture in 1907 and 1908. Its particular advantage over fungicides used previously for summer spraying of peaches was its less injurious effect on leaves and fruit.

Self-boiled lime-sulfur has proved to be a comparatively cheap and very effective spray material for the control of scab and brown rot, the commonest diseases of peaches. In spite of this, its use has certain disadvantages long recognized by growers and investigators. It must be prepared fresh for each spray, since it deteriorates if stored for any considerable time. It is not a standard product since variability in the quality of stone lime and sulfur, particularly the former, exists. This is reflected directly in the quality of the self-boiled lime-sulfur produced. Since this is a non-controllable factor from the peach grower's standpoint, it reacts to his disadvantage in getting uniform spraying results. The preparation of this spray material is difficult and, therefore, requires experienced judgment. The temperature of the water used in slaking, the method and time of adding the sulfur, the period of boiling and the time of cooling must be managed properly to produce satisfactory results. Even with careful attention to standard methods of preparation, variable results have been known to follow, and a specific method of procedure is sometimes necessary for each lot of spray material produced. This is probably the greatest disadvantage connected with the use of self-boiled lime-sulfur. A further disadvantage exists in the undesirable sediment which is frequently produced. This clogs the pump strainers and spray disks and because of its gritty nature causes premature wearing out of pump cylinder linings. Frequently this fungicide pro-

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duces a yellow to orange discoloration on the fruit which sometimes affects its market price adversely.

In spite of these disadvantages, self-boiled lime-sulfur has been the best and safest fungicide known to the peach grower until the advent of the dry-mix, which is rapidly replacing it for use on peaches in Virginia and other States.

History of the Development of Dry-Mix

Dry-mix was developed as a result of the investigations carried on at the New Jersey Experiment Station. The developments leading up to its use are described by A. J. Farley in New Jersey Bulletin No. 379 as follows: "The difficulties involved in connection with the preparation and handling of the various sulfur mixtures commonly used as summer fungicides for tree fruits in New Jersey have been recognized by the Agricultural Experiment Station for several years. The development and introduction of the New Jersey sulfur-glue mixture in 1917 was the result of an attempt to find a summer fungicide that would be an improvement over any mixture available at that time. The satisfactory results secured with this mixture for several years indicate that a good mechanical mixture of finely divided sulfur and lime applied as a wet spray is an effective summer fungicide under New Jersey conditions. The chief difficulty in the preparation of such a mixture is to wet the sulfur and bring it into suspension in water. The New Jersey sulfur-glue mixture overcomes this difficulty because the sulfur is first treated with a glue solution. The idea was conceived early in the spring of 1922 that calcium caseinate might be substituted for the glue and thus make a dry mixture of sulfur and lime that would mix readily with water."

The results of the experiments in New Jersey with the dry-mix, as given in the bulletin cited, are summarized as follows: Plats of the varieties Carman, Lola, Hiley, Belle and Elberta were sprayed in 1922 with dry-mix and with self-boiled lime-sulfur. The best results were obtained with dry-mix which produced percentages of fruit of different classes as follows: 96.1 free from disease, 2.8 slightly scabbed, 0.5 badly scabbed, 0.6 affected with brown rot. Comparable percentages in the plats sprayed with self-boiled lime-sulfur were 89.5 free from disease, 7.3 slightly scabbed, 2.4 badly scabbed, 0.8 affected with brown rot, while those for unsprayed plats were 48.6 free from disease, 34.7 slightly scabbed, 14.8 badly scabbed, 1.9 affected with brown rot.

In Ohio, according to R. C. Thomas in the Ohio Monthly Bulletin Nos. 1 and 2, 1921, dry-mix applied to Champion peaches completely

controlled brown rot while unsprayed trees had 18 to 20 per cent of infection. On Elberta peaches complete control of brown rot was obtained while the unsprayed fruit had 10 to 15 per cent of the disease.

Dry-mix is being used by fruit growers with satisfactory results in a number of states. The experience of growers in Illinois is shown in the following excerpt from a letter by H. W. Anderson of the Illinois Experiment Station dated December 18, 1924: "In general, about nine-tenths of the growers in southern Illinois used dry-mix this year. All the results we obtained from our observation indicated that dry-mix with lead arsenate was just as effective in the control of both curculio and brown rot as self-boiled lime-sulfur. We saw in no case any injury from this spray while in former years I have seen rather serious injury from the use of the self-boiled lime-sulfur. The results have been so satisfactory that I am of the opinion that no grower in southern Illinois will use self-boiled next year."

A large number of Virginia growers used dry-mix in part or in all of their peach orchards in 1924. This was especially true of the Crozet section where an especial effort was made to interest the growers in this material. The experience of these growers has been uniformly satisfactory and a majority of them stated their intentions of using dry-mix exclusively for the summer spraying of peaches in the future.

The foregoing review of experiments with dry-mix together with those conducted in Virginia which are detailed in the following section indicate that this spray material gives satisfactory control of the common peach diseases and that it has certain marked advantages over the self-boiled lime-sulfur.

Experimental Work in Virginia

The preliminary investigations of the control value of dry-mix in comparison with self-boiled lime-sulfur were begun in 1923 at Winchester in the northern Valley section of Virginia and at Crozet in the Piedmont section of this state. The investigation was made at Winchester in the commercial orchards owned by the Apple Ridge Orchard Company and in the Bond Bros. orchard. Applications were made according to the peach spray calendar given later in this bulletin. With exceptions as noted in the tables, the dry-mix and self-boiled lime-sulfur being used for all summer applications. The common and satisfactory practice among fruit growers is to omit sulfur from the first and second summer sprays. The regular spray equipment of these orchards was used to apply the sprays.

The dry-mix used at both places in 1923 was home mixed as was also that used at Crozet in 1924. Commercial dry-mix was used

at Winchester in 1924. The 8-8-50 formula was used for the self-boiled lime-sulfur throughout. Arsenate of lead when used was added at the rate of 1 pound of dry material to 50 gallons of spray mixture.

The following tables indicate the relative control value of drymix and self-boiled lime-sulfur in Virginia.

TABLE 1. — *The dates of application, materials used and results obtained with dry-mix and self-boiled lime-sulfur on Elberta peaches, Apple Ridge Orchard, Winchester, Va., 1923.**

Spray Schedule: Dry-mix — April 27, May 10, May 23, June 19, July 13
Self-boiled — April 27, May 10, May 23, June 19, July 13

Materials used: Dry-mix — 50 pounds in 200 gallons of water
Self-boiled — 8-8-50 formula
Lead arsenate — 1 pound in 50 gallons of water

Data secured at harvest time, August 1

Injury	Dry-mix	Self-boiled	Check
Scab (per cent)	trace	0.5	10.0
Brown rot (per cent)	0.4	0.9	1.6
Curculio (per cent)	0.4	2.5	22.3
Free of injury (per cent)	96.2	92.0	56.6
Total fruits (number)	1000	1000	300

Trace indicates less than 0.1 per cent.

* Acknowledgement is hereby made of the courtesy and cooperation extended through the use of the orchards and spraying equipment by the Apple Ridge Orchard Company and Bond Brothers of Winchester, Va., J. W. Quick and H. H. Brown of Crozet, Va.

TABLE 2. — *The dates of application, materials used and results obtained with dry-mix on October peaches, Apple Ridge Orchard, Winchester, Va., 1923.*

Spray Schedule: April 27, May 10, June 19, July 13

Materials used: Same as in Table 1, except for omission of self-boiled

Data secured at harvest time, August 2

Injury	Dry-mix	Check
Scab (per cent)	trace	100.0
Brown rot (per cent)	1.9	21.1
Curculio (per cent)	0.1	1.4
Free of injury (per cent)	500	none
Total fruits (number)		403
	92.2	

The data for the experimental work of 1923 indicate that dry-mix gave slightly better control of scab and brown rot than self-boiled lime-sulfur. At Winchester, the dry-mix gave considerably better

control of curculio although the amounts of lead arsenate used with both spray materials were the same.

The experimental work of 1924 followed the same lines at Winchester as that described for 1923. The same orchards and varieties were used. At Crozet, particular stress was laid on the practicability of home-mixing and the effect of applying smaller quantities of dry-mix than 50 pounds for 200 gallons of spray.

TABLE 3. — *The dates of application, materials used and results obtained with dry-mix and self-boiled lime-sulfur on Belle of Georgia peaches, Bond Bros. Orchard, Winchester, Va., 1923.*

Spray Schedule: Dry-mix — April 26, May 8, May 24, June 19, July 18
Self-boiled — April 26, May 8, May 24, June 19, July 18

Materials used: Same as in Table 1

Data secured at harvest time, August 3

Injury	Dry-mix	Self-boiled	Check
Scab (per cent)	trace	8.0	15.0
Brown rot (per cent)	0.2	5.0	14.0
Curculio (per cent)	4.1	16.0	57.0
Free of injury (per cent)	91.7	78.5	14.0
Total fruits (number)	1500	1500	500

TABLE 4. — *The dates of application, materials used and results obtained with dry-mix and self-boiled lime-sulfur on Hale peaches, Quick Orchard, Crozet, Va., 1923.*

Spray Schedule: Dry-mix — June 4,* June 18, July 2, July 21
Self-boiled — June 4, June 18, July 2, July 21

Materials used: Same as in Table 1

Data secured at harvest time, August 7

Injury	Dry-mix	Self-boiled	Check
Scab (per cent)	1.3	2.7	55.5
Total fruits (number)	807	848	117

* First application was self-boiled lime-sulfur. The earlier applications were made on both plats with arsenate of lead and lime. There was no brown rot in any of the plats.

The data given in the following tables are the result of the investigations carried on in 1924.

The data from the experimental work in Winchester during 1924 given in tables 5, 6 and 7 substantiate the conclusions made in 1923. The dry-mix in all of the experimental work of 1924 gave satisfactory

control of scab and brown rot and was superior in this respect to the self-boiled lime-sulfur. The control of insect pests was approximately equal with both materials in 1924.

TABLE 5. — *The dates of application, materials used and results obtained with dry-mix and self-boiled lime-sulfur on Elberta peaches, Apple Ridge Orchard, Winchester, Va., 1924.*

Spray Schedule: May 13, June 4, July 1

Materials used: Commercial dry-mix — 50 pounds in 200 gallons of water
Self-boiled lime-sulfur — 8-8-50 formula
Lead arsenate — 1 pound per 50 gallons of mixture

Data secured at harvest time, August 7

Injury	Dry-mix	Self-boiled	Check
Scab (per cent)	trace	2.9	87.0
Brown rot (per cent)	1.2	1.6	18.6
Curculio (per cent)	0.1	0.1	1.0
Free of injury (per cent)	98.8	94.0	6.6
Total fruits (number)	4250	4250	600

TABLE 6. — *The dates of application and results of syraying October peaches with dry-mix, Apple Ridge Orchard, Winchester, Va., 1924.*

Spray Schedule: May 13, June 4, July 1

Data secured at harvest time, September 5

Injury	Dry-mix	Check
Scab (per cent)	2.0	100.0
Brown rot (per cent)	trace	5.7
Curculio ((per cent)	trace	1.7
Free of injury (per cent)	98.0	none
Total fruits (number)	1750	1220

The investigations at Crozet with different amounts of dry-mix (30, 40 and 50 pounds in 200 gallons of water) given in table 8 indicate that satisfactory commercial control of scab was obtained with less than 50 pounds of the fungicide in 200 gallons of water. The control secured with 30 pounds in 200 gallons of water was not quite so good as that obtained with larger quantities but it was very satisfactory from a commercial standpoint. All of the peaches in the sprayed plats which were recorded as scabby were so slightly affected that there was no reduction in grade on this account. It is believed that under average conditions 32 pounds of dry-mix per 200-gallon tank will give as satisfactory results as larger quantities, and the saving in material which results is considerable.

Compared to self-boiled lime-sulfur, the preparation of the dry-mix is much easier. The hydrated lime which is used in dry-mix is of fairly uniform quality and the finest grades of dusting sulfur which are recommended for dry-mix are more uniform than the flowers of sulfur used in the preparation of self-boiled lime-sulfur. Running the dry ingredients through the hand mixer is a simple operation which requires no previous experience.

TABLE 7. — *The dates of application, materials used and results obtained on Belle of Georgia peaches, Bond Bros. Orchard, Winchester, Va., 1924.*

Spray Schedule: May 17, June 12, July 2

Materials used: Same as in Table 1

Data secured at harvest time, August 1

Injury	Dry-mix	Self-boiled	Check
Scab (per cent)	2.9	8.0	95.6
Brown rot (per cent)	1.4	1.5	2.4
Curculio (per cent)	0.2	0.5	2.1
Free of injury (per cent)	96.5	91.9	4.3
Total fruits (number)	6000	3370	1336

TABLE 8. — *The dates of application and the scab control resulting from spraying Belle of Georgia, Elberta and Hale peaches with three different amounts of dry-mix (30, 40 and 50 pounds in 200 gallons of water) Brown Orchard, Crozet, Va., 1924.*

Spray Schedule: May 19, June 6, June 20, July 15

Data secured at harvest time, August 12

Variety	Percentage* clean fruit	Pounds of dry-mix	Percentage of scab	Total fruits
Belle of Georgia	91.3	30	3.3	1040
Belle of Georgia	94.8	40	2.0	801
Belle of Georgia	94.8	50	0.8	864
Elberta	93.4	30	0.7	1124
Elberta	95.4	40	0.2	1149
Elberta	97.9	50	0.3	1198
Hale	93.7	30	3.2	1228
Hale	98.4	40	trace	1077
Hale	97.5	50	trace	1108
Check (Hale)	1.3		98.8	801

* The percentage of clean fruit was calculated after considering injury caused by scab, soldier bug, bacterial spot and worms. The percentage of injury from all sources other than scab was so slight in the check that the control values could not be calculated satisfactorily.

A season's supply of dry-mix can be prepared in one operation before the spraying season begins. It can be stored indefinitely without deterioration and, therefore, it is at all times available for any particular spraying operation.

Properly prepared and diluted dry-mix produces no sediment in the tank and consequently no loss of time incident to clogging of pump strainers and sprayer disks.

Dry-mix has greater adhesive properties than the self-boiled material and consequently covers the leaf and fruit surfaces more completely but we have noted in two years of work with this fungicide that practically no spray burning has resulted. It is quite probable that one of the underlying causes for the efficacy of this fungicide is its property to spread uniformly and adhere longer than self-boiled lime-sulfur. It is a comparatively easy matter to observe the thoroughness of spraying after an application of dry-mix. Upon drying, a yellowish-gray residue is the indicator which enables a careful observation to be made of the spray pattern.

The advantages just noted are great when the ability of the hired help usually available is taken into consideration. Dry-mix is as nearly fool-proof as any fungicide ever developed.

The Preparation of Dry-Mix

Dry-mix is prepared from the formula which requires 64 per cent of fine dusting sulfur, 32 per cent of hydrated lime and 4 per cent of dry calcium caseinate, which is sold under various trade names. On the basis of 100 pounds of sulfur the formula for dry-mix is as follows:

100 pounds fine grade of dusting sulfur
50 pounds hydrated lime
6-¼ pounds dry calcium caseinate

The mixing is a comparatively simple operation which can be done at home. In commercial peach orchards it will be found advisable to use some form of mixer. They are economical in time and labor and produce a better mix than can be secured in other ways. A home-made barrel mixer, as shown in figure 1, built according to the following general directions will be found satisfactory. Concrete mixers, barrel churns or other devices of this type have also been used satisfactorily.

Procure a good 50-gallon oak barrel, two thin pieces of strap iron, two one-inch iron rods one foot long and a crank. An opening large enough to permit the entrance of a small scoop should be cut

in the middle of the barrel. The staves cut for the door of this opening should first be fastened by the two strips of strap iron. The door is hinged and then padded in such a way that none of the fine materials can escape. The two iron rods are split at one end to a depth of two inches and each half is flattened out at right angles to the plane of the rod so that they will fit the heads of the barrel accurately, after which they are bolted securely to the heads in such a way that the ends will form axles exactly in the centre of the heads of the barrel. To mount this barrel, a simple method is to bore a one-inch hole through a post about four feet from the floor through which the iron rod opposite the crank end is inserted. A suitable support made of a 2 x 6 plank notched at the top and properly braced will hold up the crank end of the mixer.

A strong box 2½ feet deep with the same length and width as the barrel is necessary for the sieving operation. A sieve is made to fit into this box in such a manner that a flange around the top of the sieve supports it on the top of the box and permits it to hang in the box. The sieve should be made of one-inch lumber 6 inches wide and the wire screen fastened to its bottom edge should be a good grade of brass wire screen having 14 meshes to the inch.

Mixing Operation

Place 7 or 8 smooth rocks about the size of an apple in the barrel before adding the material. These rocks act as mixers and prevent the dry-mix from adhering to the sides of the barrel. In a 50-gallon barrel, 156 pounds of dry-mix can be prepared at one time. If the sulfur and lime are lumpy they should be sieved before being placed into the barrel. First place 50 pounds of hydrated lime and 6¼ pounds of calcium caseinate in the barrel and then add 100 pounds of sulfur. If the lime is added last, considerable dust is raised. If the materials are not lumpy they can be mixed without sieving. After mixing, the material should be placed in bags large enough to hold 50 pounds. Sulfur bags are not suitable for storing dry-mix because it sifts out. A 50-pound paper flour bag or a cement bag is recommended.

The proper amount for each spray tank is weighed out at the mixer and bagged, thus saving time when spraying begins. The mixing should be done before the spraying season opens and the dry-mix may be stored in a dry place indefinitely. It becomes lumpy after a period of storage, therefore, it is necessary to sieve it before placing it in the sprayer tank.

A satisfactory mixture has been obtained after turning the mixer three minutes. Two men operating the mixer can mix and bag 156 pounds every 10 minutes.

A considerable reduction in cost can be effected by the home mixing of materials. By using the barrel mixer it was possible to prepare dry-mix in 1924 for 2½ cents per pound and have it weighed out ready for the spray tank. The cost of building a mixer is practically negligible because most of the material for its construction can be found on any farm.

Figure 1. — A satisfactory home-made barrel mixer in which 16,000 pounds of dry-mix were prepared at Crozet, Va., in 1924.

Methods of Dilution

Three different methods of diluting the dry-mix have been tried. With an overhead intake pipe the dry-mix has been poured directly into the inflowing stream just above the tank strainer. The second method is to fill the spray tank two-thirds full of water and while the agitator is running pour the dry-mix directly into the tank using a spray gun with the disk wide open to spread and mix the material with the water.

The dilution method which has been found more satisfactory than either of the two preceding methods is as follows: The proper amount of material (32 pounds for 200-gallon spray tank) is placed in a water tight barrel and sufficient water is added to make a thick doughy paste after stirring with a paddle. Sufficient water is then added to make a thin paste that can be poured through the strainer. The spray tank is filled half full with water and this thin paste is

Figure 2. — Brown Rot of Peaches.

A peach infected by brown rot is a total loss. Infection is due to inoculum from mummied peaches on the tree and ground and from infected twigs. Clean cultivation, removal of mummies from the trees and the application of dry-mix will control this disease satisfactorily. (Courtesy U. S. Dept. Agriculture.)

poured through the strainer while the agitator is running. Some growers have used the suction hose of the sprayer to draw this mixture into the tank but this is not advisable because the heavy solid content of the paste wears out cylinder linings and clogs the pump valves. After the dry-mix has been diluted, the lead arsenate is added. The proper method of adding lead arsenate to a tank of dry-mix is to first dilute it in water. To a wooden bucket half full of water,

the proper amount of dry lead arsenate is added slowly, with constant stirring until a thin paste results. Dry lead arsenate should not be placed in a bucket and water added to it because a doughy layer of the lead arsenate will adhere to the bottom of the bucket which can only be removed with difficulty. The thin paste should be poured through the strainer with the intake water just before the tank is full and the agitator should be running. Dry lead arsenate should never be added to any spray material without first diluting it into a thin watery paste.

Variation in Casein Content of Spreaders

The excellent spreading and sticking qualities of dry-mix are due in large measure to casein, an essential component of the spreader. The efficiency of the various brands of calcium caseinate is determined by their casein content, according to studies of J. F. Adams of the Delaware Experiment Station. These studies, which are reported in the Transactions of the Peninsular Horticultural Society for 1924, show that the majority of the commercial spreaders have a casein content of approximately 23 to 25 per cent. The original formula of dry-mix and that given in this bulletin is based on spreaders of this type. There is, however, a second group of spreaders with a casein content of 47 to 50 per cent, or approximately double that of the first group, and these, according to Adams, may be used in one-half the quantity of the first group. The use of spreaders of the second type effects a considerable saving in cost of material. We have had no experience with spreaders of high casein content but the point is well worthy of attention.

Comparative Costs of Home-Made Dry-Mix and Self-Boiled Lime-Sulfur

In the Crozet section during the 1924 season the ingredients for making dry-mix were laid down to the growers at the following prices when purchased in considerable quantities:

Dusting sulfur	2.6c per pound
Hydrated lime	.8c per pound
Calcium caseinate	14.0c per pound

At these prices, one pound of dry-mix costs about 2.5c or 80c per 200-gallon tank when used at the rate of 32 pounds per tank. The cost at the rate of 50 pounds per tank is $1.25. These figures do not include the cost of labor or lead arsenate.

Many growers have in recent years used dusting sulfur in the preparation of self-boiled lime-sulfur. Using a good grade of stone lime with dusting sulfur the cost of materials for a 200-gallon spray tank in 1924 was $1.16 not including the cost of labor and lead arsenate.

It is apparent from the figures given above that home-made dry-mix when used at the rate of 32 pounds per tank is cheaper than self-boiled lime-sulfur. It is considerably cheaper than the commercial dry-mix at the prices usually quoted.

Spray Calendar for Peaches

No.	Time of Application	Materials to Use	Parasites
1	Dormant season (before buds have commenced to swell) February or early March	Standard strength concentrated lime-sulfur diluted 1 in 8 parts of water	Scale Leaf curl
2	Immediately after the petals drop	One lb. powdered lead arsenate to 50 gals. of water; add 3 lb. freshly slaked lime to each 50 gals. of solution	Curculio
3	One week after No. 2	Same as in No. 2	Curculio
4	Three weeks after No. 3	Dry-mix or self-boiled lime-sulfur. Add 1 lb. powdered lead arsenate to each 50 gals. of solution	Curculio Scab
5	One month before fruit ripens	Dry-mix or self-boiled lime-sulfur	Scab Brown rot
6	For late varieties only; three weeks after No. 5	Same as in No. 5	Brown rot

Recommendations for Using Dry-Mix

The experimental evidence in Virginia and other states proves that dry-mix is a safe and effective summer spray for peaches. It is cheap and easy to prepare and is, therefore, recommended to Virginia peach growers.

Dry-mix should be prepared according to the formula given on page 10 and should be thoroughly mixed in a barrel mixer or other satisfactory mixing device. Commercial dry-mix is satisfactory but costs more than the home mixed material. It is diluted at the rate of 8 pounds in 50 gallons of water or 32 pounds in a 200-gallon spray tank. In combination sprays powdered lead arsenate at the rate of 1 pound to 50 gallons of spray material or 4 pounds in a 200-gallon tank should be added according to the method previously described.

Using spray rods at a pressure of 175 pounds per square inch produces an ideal spray. Excessive spraying pressure and the use of

guns is not advisable because of the injury to the tender peach foilage.

The spray calendar on page 15 has proved satisfactory for peaches in Virginia.

Summary

Dry-mix is the cheapest and safest summer spray material for peaches in Virginia.

This fungicide has given slightly better control of the common peach diseases, scab and brown rot, than self-boiled lime-sulfur in Virginia and other states. However, the ease of preparation, its adaptability for storage and its advantages in the spraying operation give it a distinct superiority over self-boiled lime-sulfur.

The formula of dry-mix requires 64 per cent of fine dusting sulfur, 32 per cent of hydrated lime and 4 per cent of dry calcium caseinate. Using 100 pounds of sulfur as a basis, the formula requires the addition of 50 pounds of hydrated lime and 6¼ pounds of dry calcium caseinate.

Home preparation of dry-mix is recommended. Mixing in a home-made barrel mixer produces a satisfactory product at a considerable saving over the ready mixed commercial dry-mix.

Dry-mix should be diluted at the rate of 32 pounds for 200 gallons of spray mixture. A thin watery paste of the material should first be prepared and then poured through the strainer and into the tank half-full of water with the agitator running. The tank should then be filled.

The cost of 32 pounds of home-made dry-mix, the amount for one 200-gallon tank, in 1924 was approximately 80 cents. The cost of self-boiled lime-sulfur for 200 gallons of spray material was $1.16. The cost of commercial dry-mix was considerably greater. These figures do not include the cost of lead arsenate and labor.